

schools are often employed on fine days in planting out young trees. Thus during last summer some thousand acres have been planted in a single parish alone. Of late years private individuals too have done a great deal to retrieve the deforestation which has been going on by planting new trees. In one single parish in Norway, for instance, a proprietor has planted on waste land no less than a quarter of a million of spruce, fir, and larch trees, all obtained from the Government nursery. The price of the young plants is one farthing, and only 10 per cent. of the plants die. After thirty years each is valued at 7*d.* in the ground. These are of course valuations in a country where both labour and timber are cheap.

We learn that Dr. J. G. Garson has just been elected a Corresponding Member of the Anthropological Society of Paris.

As a memorial to the late Sir Titus Salt, and in recognition of his benefactions to Saltaire, the Governors of the Salt Schools have decided to build a new Science and Art School, costing about 6000*l.* The building will be completely finished by May 15, on which day will be opened an important exhibition on the lines of the late International Inventions Exhibition. For this purpose the present buildings and a field of six acres will be utilised. The arrangement and supervision of the lighting and other electrical work have been intrusted to Messrs. Woodhouse and Rawson, of London.

In the last number of the *Bulletin* of the American Geographical Society, Mr. Ernest Ingersoll publishes a paper on the manner in which the settlement of North America has affected its wild animals. He takes in succession the customary divisions of animal life—mammals, birds, reptiles, fishes, and the almost countless invertebrates, and shows how far these prevailed geographically in historical times, and how they have now either disappeared altogether, or been driven northwards into the Canadian forests, or, in the case of fish, away from the coasts. Mr. Ingersoll thus ranges over the whole animal kingdom, and in every department he has to record destruction—in many cases wanton and useless—and disappearance. It is a most instructive and interesting paper.

THE Sanitary Institute of Great Britain has just completed the preparation of a volume which will be of great interest to the statistical world, containing selections from the reports and writings of the late Dr. W. Farr. The selection of the papers and reports and the editing of this work have been undertaken by Mr. Noel A. Humphreys, of the Registrar-General's Office. The volume consists of 550 pages and is divided into six parts: (1) population, (2) marriage, (3) births, (4) deaths, (5) life tables, (6) miscellaneous. It has long been the source of much regret among students of vital statistics, and others practically interested in that branch of sanitary science, that from the form and manner of the publication of Dr. Farr's valuable papers on statistics they have not been generally available, being scattered over a long series of Blue-Books and other Reports. The object of the Institute in publishing the selection is to give those interested in the subject a ready means of studying the valuable writings and tables of that eminent statistician.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus* ♀) from India, presented by Mrs. Berry; two Black-eared Marmosets (*Hapale penicillata*) from South-East Brazil, presented by Miss L. M. Graham; two Emus (*Dromæus nova-hollandie*) from Australia, presented by Lord Northesk; an Emu (*Dromæus nova-hollandie*) from Australia, presented by Mr. A. Garrett Smith; a Cuvier's Podargus (*Podargus cuvieri*) from Australia, presented by Mr. Cromwell Collins; a Tawny Owl (*Syrnium aluco*), British, presented by Mr. Phillips; an Anaconda (*Eunectes murinus*) from Demerara, presented by Mr. G. H.

Hawtayne, C.M.Z.S.; a Robben Island Snake (*Coronella phocorum*), a Hoary Snake (*Coronella cana*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.

OUR ASTRONOMICAL COLUMN

THE FRENCH PHOTOGRAPHS OF THE TRANSIT OF VENUS.—The measurement of the 700 photographs obtained at the various French stations during the transit of Venus, 1882, is about to be commenced. An office has been organised for the purpose, the necessary credit has been granted, and a measuring instrument, belonging to the Meudon Observatory and lent by M. Janssen, has been supplied. This will be replaced in January next by a smaller one by the same makers, MM. Brunner, Frères. The measurements, it is expected, will be completed in fifteen months.

THE ABSORPTION-SPECTRUM OF OXYGEN.—M. Janssen, continuing at the Meudon Observatory his important and difficult researches on the spectra of the gaseous constituents of the terrestrial atmosphere, has recently given (*Comptes rendus*, vol. ci. No. 14) a brief notice of the results he has obtained. The spectrum of an intensely brilliant light is viewed through a tube 60 m. in length containing oxygen, the pressure of the gas being constantly increased up to a pressure of 27 atmospheres. With the increase of pressure, dark lines or groups of lines appear. The first to appear are those groups in the red, which M. Egoroff, who was the first to observe them, considered to be the A and B of the solar spectrum. With higher pressures, and a more brilliant source of light, lines are suspected between A and B and between B and C. Lastly, with the greatest pressures three dark bands appear; one near *a*, one near D, but more refrangible, and one in the blue. The solar spectrum does not show any similar bands, which, therefore, can scarcely be ascribed to oxygen in the state in which it exists in our atmosphere.

THE APPARENT ENLARGEMENT OF CELESTIAL OBJECTS NEAR THE HORIZON.—M. Paul Stroobant has recently devoted a considerable amount of care to examining the cause of this well-known phenomenon. His experiences lead him to reject the theories most commonly received, that the appearance is due either to comparison with terrestrial objects, or to the "flattened arch" shape ascribed to the celestial vault. Experiments made with pairs of electric sparks in a lofty hall, showed that if the two sparks overhead were 100 mm. apart, the pair on a level with the eye, and equally distant from the observer, needed only to be 81.5 mm. apart to seem separated to a similar extent. Comparisons of various pairs of stars gave a similar result, and the following formula was found to represent the apparent size, G, of a celestial object, at any given altitude, H, when the size on the horizon was taken as 100:—

$$G = 100 - 19 \sin H.$$

Beside this relation, depending evidently on some physiological effect connected with the position of the head, M. Stroobant found that an increase in the brightness of an object caused an apparent diminution in its size, and *vice versa*. The great apparent size of the moon at rising was therefore, he considered, largely due to its comparative faintness when near the horizon.

NOVA ANDROMEDÆ AND ITS RELATION TO THE GREAT NEBULA.—There seems to be considerable difference of opinion as to whether the new star is to be regarded as having a real physical connection with the nebula, or as being connected with it in appearance only. M. Trouvelot (*Comptes rendus*, vol. ci. No. 17) ably pleads for the latter view. Comparing the present aspect of the nebula with the chart he made of it in 1874, he finds two new stars in the central district, one being the present *Nova*, the other a star of the 13th or 14th magnitude, which precedes it by about 20s. But he believes that the nebula itself has undergone no change during the appearance of the *Nova*, the impressions to the contrary being, he thinks, due to the superior light of the star having overpowered for a time the surrounding portions of the nebula; so that the arguments founded upon these supposed or apparent changes lose their force. The 1874 chart shows some 1283 little stars, which by their feebleness and crowding present the characteristic features of the Milky Way, which indeed appears to extend somewhat beyond the nebula; and these stars also appear to become less and less numerous the farther the observer travels from the Milky Way.

But none of the stars visible upon the nebula show diffused or ill-defined borders; so that they are probably neither in the nebula nor behind it, but before it, and forming part of the Milky Way. And as the two new stars alluded to are also well and clearly defined, he argues that they also are connected with the Milky Way, and not with the nebula, which he regards as lying behind it.

THE NICE OBSERVATORY.—The great objective of 30 inches diameter, intended for the Nice Observatory, and the glass for which was supplied by M. Feil, has just been completed by the Brothers Henry, and has been placed in the hands of M. Gautier, who is constructing the equatorial, which he hopes to finish by April next.

ASTRONOMICAL PHENOMENA FOR THE WEEK, 1885, NOVEMBER 29 TO DECEMBER 5

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on November 29

Sun rises, 7h. 43m.; souths, 11h. 48m. 35'7s.; sets, 15h. 54m.; decl. on meridian, 21° 34' S.: Sidereal Time at Sunset, 20h. 29m.

Moon (at Last Quarter) rises, 23h. 16m.*; souths, 6h. 9m.; sets, 12h. 49m.; decl. on meridian, 6° 58' N.

Planet	Rises	Souths	Sets	Decl. on meridian
	h. m.	h. m.	h. m.	
Mercury ...	9 45 ...	13 20 ...	16 55 ...	25° 47' S.
Venus ...	11 25 ...	15 14 ...	19 3 ...	23 56 S.
Mars ...	23 22* ...	6 16 ...	13 10 ...	9 49 N.
Jupiter ...	1 31 ...	7 36 ...	13 41 ...	0 16 N.
Saturn ...	17 49* ...	1 58 ...	10 7 ...	22 23 N.

* Indicates that the rising is that of the preceding day.

Occultations of Planet and Star by the Moon

Dec.	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image
			h. m.	h. m.	
1 ...	Uranus ...	—	5 0 ...	6 9 ...	0 0
3 ...	κ Virginis...	4½	4 24 ...	4 56 ...	92 155

Phenomena of Jupiter's Satellites

Nov.	h. m.	Dec.	h. m.	
29 ...	3 23	I. tr. ing.	3 ...	1 53 II. ecl. disap.
29 ...	5 39	I. tr. egr.	3 ...	7 0 II. occ. reap.
30 ...	3 0	I. occ. reap.	4 ...	5 9 III. tr. ing.
			5 ...	2 8 II. tr. egr.
			5 ...	7 3 I. ecl. disap.

The Occultations of Stars and Phenomena of Jupiter's Satellites are such as are visible at Greenwich.

Nov. 29 ... 9 ... Mars in conjunction with and 3° 23' north of the Moon.

30 ... 23 ... Jupiter in conjunction with and 0° 20' north of the Moon.

Dec. 1 ... 0 ... Mercury at greatest elongation from the Sun, 21° east.

Variable Stars

Star	R.A.	Decl.	Epoch	Phase
	h. m. s.	h. m.		
U Cephei.	0 52 8 ...	81° 15'3 N.	Nov. 29, 3 27 ...	m
			Dec. 4, 3 7 ...	m
Algol ...	3 0 41 ...	40 30'7 N.	Nov. 29, 5 20 ...	m
			Dec. 2, 2 9 ...	m
λ Tauri ...	3 54 19 ...	12 9'9 N.	" 4, 22 58 ...	m
			Dec. 1, 20 9 ...	m
η Aquila..	19 46 37 ...	0 42'7 N.	" 5, 19 1 ...	m
			Nov. 30, 2 30 ...	M
			Dec. 4, 21 30 ...	m
δ Cephei..	22 24 54 ...	57 49'6 N.	Nov. 30, 1 0 ...	m

M signifies maximum; m minimum.

The spectrum of R Andromedæ R.A. oh. 17m. 58s., Decl. 37° 56'4 N. deserves attention. The star is now approaching its maximum.

The following circular has been sent out from Lord Crawford's Observatory, Dun Echt:—"Considering the great uncertainty

which envelopes the fate of Biela's comet, it seems desirable to call to mind that about midnight on the 27th inst. the earth will be in the path of the meteors seen to radiate from near γ Andromedæ on November 27, 1872. The comet's periodic time, and presumably that of the meteors being about 6·6 years, nearly two periods will have elapsed since the meteoric shower of 1872. If, therefore, the meteors are very widely distributed along the comet's orbit, there is a chance that they may again appear in considerable numbers this year. In 1892, and still more in 1905, there is a probability of a return of the display of 1872.

GEOGRAPHICAL NOTES

LIEUT. GREELY has been lecturing in Scotland on the Arctic Expedition of which he was the commander. At Dundee, on Monday night, having described the retreat from Discovery Harbour, Lady Franklin Bay, he went on to speak of the results of the Expedition, which could be done only in a general manner. The temperature observations, he remarked, were mainly important in determining the fact that Grinnell Land had the lowest mean temperature in the globe, about 4° F., or 20° C. below zero. This was in accordance with their expectations. The tidal observations, only roughly reduced by him at Conger, confirmed the work of 1875-76, but a large number of simultaneous readings at seven special stations in the Polar Sea, Robeson and Kennedy Channels, should enable tidal experts to determine quite accurately the shape and direction of the tidal wave, an important element in the theoretical determination of the configuration of lands and sea-bottom to the north. In Grinnell Land the discovery of coal not only at various points along the sea-coast, but at others in the interior, proved conclusively the changed climatic condition, as did the fossil forest found near Cape Baird in 81° 30' N. Discoveries of Eskimo remains were of interest as showing the possible extent of this immigration of a new race into the Polar Basin. The Lieutenant next spoke of geographical discoveries. The furthest point seen by Beaumont was Cape Britannia, nearly 50 miles beyond the extreme point actually attained by that heroic officer. From Britannia Island Lieut. Lockwood and Sergeant Brainard pushed on 100 miles further, and passed a day and a half at Lockwood Island, the furthest point by land or sea ever attained by civilised man, in 83° 24' N., 40° 46' W. From an elevation of nearly 3000 feet it was evident that no land existed within a radius of sixty miles to the north or north-westward, but to the north-east the Greenland coast yet trended, ending to the eye at Cape Washington in 83° 35' N. To Greenland was thus added 125 miles of new coast excluding the fiord lines, and from Cape May the mainland was carried a degree of latitude to the northward. In carrying Greenland 10° of longitude further to the eastward, Lieut. Lockwood left but 16° for his successors to fill in. The new land is composed of high precipitous promontories along the coast, and equally broken country inland, in which but three glaciers were seen, none discharging. It was evident that the inland ice-cap of Greenland stopped far to the southward of the 82nd parallel. In short, there existed from Robeson and Kennedy Channels, westward to Greely Fiord and the Polar Sea, a series of fertile valleys clothed with vegetation of luxuriant growth, whereon were large herds of musk oxen. He desired to say a few words as to his discoveries concerning the much-talked-of palæocrystic ice, especially the floebergs from 100 to 1000 feet thick. The opinion advanced by Sir G. Nares that this ice formed over the Arctic Ocean was not borne out by facts, and he could not commit himself to the judgment that this sea was for ever unnavigable, for they knew that a quantity of the ice changed from year to year, and little of it was seen by Lieut. Lockwood to the northward of Cape May. Dr. Moss was certainly correct as to the universality of stratification in this ancient ice, and he concurred in the opinion that its salinity was due to efflorescence and infiltration. There was no doubt in his mind that these floes were simply detachments of slowly-moving glacial ice-caps from an ice-covered land in the neighbourhood of the Pole. Lieut. Lockwood found small floebergs, perhaps 100 to 200 feet thick, detached from the adjacent ice-caps. In Kane Sea he visited a floeberg a third of a mile wide, a quarter of a mile long, and from a fifth to a sixth of a mile thick. The proof as to its terrestrial origin no one would dispute; on its surface were two valleys about 30 feet deep, along which were the medial moraines of the glacier—fully 100 large stones polished and worn smooth in places by the parent ice. He thought it doubtful